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DOCKET NO.: 4116

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
IN THE MATTER OF THE APPLICATION FOR PATENT

OF: Ernst M. SPENGLER | ART UNIT: 1732
USSN: 09/929,693 | CONF. NO.: 8851
FILED: August 13, 2001 |
FOR: Method and Apparatus for Molding
Components With Molded-In Surface
Texture

ASSISTANT COMMISSIONER FOR PATENTS

WASHINGTON, D. C. 20231

February 10, 2003

SUPPLEMENTAL THIRD INFORMATION DISCLOSURE STATEMENT WITH
CERTIFICATE OF TELEFAX TRANSMISSION ON LAST PAGE

Dear Sir:

- 1) This is a Supplement to applicant's Information Disclosure Statement filed on October 2, 2002. The references cited in applicant's third Information Disclosure Statement of October 2, 2002 are now being further discussed herein.
- 2) This Supplemental Information Disclosure Statement is being filed before the mailing of a first Office Action on the merits, to the best knowledge of the undersigned attorney, in accordance with 37 C.F.R. 1.97(b)(3). Thus, a fee is not due for the submission

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of the present Supplemental Information Disclosure Statement. Nonetheless, if any fee is properly required in connection with this submission, it may be charged to Deposit Account 50-0507.

- 3) Reference AR (German Utility Model 87 06 204) discloses an apparatus for producing molded parts or articles from thermoformable synthetic plastic films, webs or panels. The plastic film or the like is held under tension and is heated and subjected to a pressure difference to bring the material into a negative deep drawing mold, in which the material is deformed or molded while also forming the surface structure or grain thereof. Thereafter, the back side of the plastic film or the like is subjected to a further treatment. A vacuum and/or negative pressure is applied to the negative deep drawing mold, which has a micro porous air permeable mold surface, which comprises a layer of metal, metal alloys, micro metal particles, ceramic-metal, and/or ceramic micro metal particles and/or comminuted filler particles. A positive mold or stamp is allocated as a counter tool to the negative deep drawing mold. The main focus of the disclosure relates to the composition, thickness, and other characteristics of the micro porous layer forming the surface of the negative deep drawing mold. The plastic film materials may be deep drawable, unfoamed monofilms or composite films or multi-layer laminated films. The film may include a bottom film layer and a top film layer of different materials. Foamable plastics can additionally be provided for filling out the back of the film with foam. The plastic web may include a first modifying agent with a glass transition

temperature of greater than 70°C and/or a second modifying agent with a glass transition temperature of less than 60°C. The structured, porous, and air permeable surface of the negative deep drawing mold forms a grain or surface structure into the plastic film surface, while the back side of the film may have a treatment medium applied thereon. The treatment medium may be a cooling liquid or a cold gas, which cools the plastic web to or close to the unforming temperature, whereby the molded and grained plastic film is cooled in a sudden shock-like manner, whereby the achieved surface graining is maintained even in the micro range.

- 4) Reference AS (German Patent Laying-Open Document 37 14 365), in addition to what is summarized in the English Abstract thereof, discloses that the plastic film, which is to be molded and provided with a surface grain or texture, can additionally be laminated or provided with a heat stable foamable plastic or a foam, preferably a polyolefin foam with a thickness of 0.5 to 10 mm, before being three-dimensionally molded and provided with a surface graining of the film in the negative deep drawing mold. The foam layer may be backed by a carrier or carrier layer, whereby the carrier may preferably be pre-molded, arranged in exact positional registration and then connected or bonded with the foam and/or the molded synthetic plastic film web. Alternatively, the plastic film, after the three-dimensional molding and surface graining or structuring thereof, while it is still in the same molding tool, either after or during cooling off, or in a separate work cycle and/or in a different form, may

be back-foamed with a moderately hard foam, preferably a polyurethane foam, whereby an additional carrier or carrier layer may also be embedded.

- 5) Reference AT (German Patent Laying-Open Document 37 14 366), in addition to what is summarized in the English Abstract thereof, discloses that the plastic films that are to be molded and provided with a surface grain or texture can additionally be laminated or provided with a heat stable polyolefin foam, preferably a polypropylene foam with a thickness of 0.5 to 10 mm, before being three-dimensionally molded and surface textured or grained in the negative deep drawing mold, whereby a carrier or carrier layer may be arranged to back up the foam layer. Alternatively, the plastic film may be back-foamed with a moderately hard foam, preferably polyurethane foam, in the same mold tool or in a different mold, after or during cooling off, whereby an additional carrier or carrier layer may further be embedded in the back-foaming.
- 6) Reference AU (German Patent Laying-Open Document 37 14 367), in addition to the subject matter summarized in the English Abstract, discloses that at least the upper surface layer of the synthetic plastic film web being deformed and surface grained or textured, is heated to be within or above the thermoplastic temperature range, whereby a temperature difference of more than 30°C is provided between the molding tool temperature and the temperature of the plastic web, while simultaneously or thereafter, a colder treatment liquid is applied to the back side

of the thermoformed plastic web located in the negative deep drawing mold. A temperature difference of more than 30°C is maintained between the treatment liquid and the plastic web. The plastic film may be laminated or provided with a heat stable polyolefin, preferably polypropylene foam before being three-dimensionally molded and surface textured or grained in the negative deep drawing mold.

- 7) Reference AV (German Utility Model 87 09 582) discloses an apparatus for producing molded parts or articles of thermoformable plastic films, plastic-containing webs, or plastic panels using a negative deep drawing method by means of heat and a pressure difference. The negative deep drawing mold has a surface layer that is porous and air permeable, or has holes provided therein, and that comprises a metal, metal alloy, micro-metal particles, ceramic-metal and/or ceramic micro metal particles and/or strength enhancing additives, or a synthetic plastic or resin that withstands the temperatures used in the molding method. The male mold or stamp cooperating with the negative deep drawing mold has a surface with holes, pores, or recesses, and preferably bored holes therein. The surface of this mold tool may similarly have a layer of various metal or synthetic resin materials or the like. The films to be molded can be laminated or otherwise provided with a heat stable foam, preferably a polyolefin and especially a polypropylene foam before being deformed and surface textured or grained in the negative deep drawing mold.

- 8) Reference AW (German Patent 37 23 021) in addition to what is summarized in the English Abstract thereof, discloses a method and an apparatus for producing molded parts of thermoformable synthetic plastic films, plastic containing webs or plastic panels by a negative deep drawing method, wherein the plastic film or the like is preheated and/or heated to a temperature within the thermoplastic range thereof in a preheating station, tensioned and carried by a tenting or sealing frame, preferably held or supported by pre-blowing supporting air or supporting gas, followed by increasing the blowing pressure, applying a negative pressure, and/or using a male stamp mold tool to deform the plastic film or the like toward the negative deep drawing mold, and then pre-molding the film or the like using the male stamp mold tool, and then preferably intermediately forming the plastic film or the like using a male stamp mold tool, whereupon thereafter the front side of the plastic film or the like comes into the negative deep drawing mold to achieve the final resultant molded shape and the surface grain and/or decoration by means of thermoforming. Preferably a temperature difference of more than 50°C is maintained between the plastic film or the like and the negative deep drawing mold, and thereafter the molded film is cooled down in the negative deep drawing mold. By means of controlled heating and/or controlled cooling, before or shortly before the thermoforming, a temperature is maintained in a surface layer on the back side of the plastic film or the like, which is more than 5°C lower than the temperature on the film surface facing toward the negative deep drawing mold, where the temperature is close to or above the melting range or melting

point or at a temperature within the thermoplastic range (up to 260°C). The surface graining or decoration is carried out with a porous air permeable preferably micro porous molding surface layer provided on the negative deep drawing mold. With this method, the elongation ability and the breaking elongation of the film is maintained or improved during the deformation or molding process. A reduced pressure or vacuum may be applied to the negative deep drawing mold by first achieving an air tight seal or closure of the mold opening. Before, during or shortly after the airtight sealing, the applied vacuum is discontinued or relieved, and/or a pressure is applied to the film back side via the male molding stamp tool or the surface thereof, in the range from 4×10^2 to 4×10^5 Pa, and/or from the side of the deep drawing mold, a reduced pressure or vacuum is exerted while sucking the plastic film onto the negative deep drawing mold.

- 9) Reference AX (German Patent 38 34 607) is a further development of the subject matter of German Patent Publication 37 14 366 (reference AT). In addition to the subject matter summarized in the English Abstract, this reference discloses that the plastic film web or the like is bonded without an adhesive to the pre-formed support or substrate. The preformed supporting substrate can be carried on the positive male stamp mold member. The film is preformed by the pressure differential and/or by the pre-molded supporting substrate in a direction toward the negative deep drawing mold, and the bonding of the film onto the supporting substrate takes place during or after the thermoforming of the plastic film, web or panel located in the

negative deep drawing mold. The bonding takes place without an adhesive in the thermoplastic or melting range of the plastic material of the film or the like. The plastic film or the like is preheated to a temperature within the thermoplastic range, then supported by blowing air or a gas, and then deflected toward the negative deep drawing mold by increasing the blowing pressure, in addition to using the preformed supporting substrate and/or the positive male stamp mold member. The plastic film is in a temperature close to or above the melting range, the melting point, or within the thermoplastic range, while the tool temperature is at least 30°C below the melting point, melting range or softening temperature of the plastic film or the like. A heat stable polyolefin, preferably polypropylene foam or a polyurethane foam may be additionally provided or laminated onto the plastic film, before the three-dimensional molding in the negative deep drawing mold, whereby the foam layer is further backed by a supporting substrate or carrier layer. The entire thickness range of the plastic film, web or panel is in a thermoplastic condition before it is brought into the negative deep drawing mold.

- 10) Reference AY (German Patent Laying-Open Document 38 34 608) is a further development of the subject matter of German Patent Document 37 14 366 (reference AT). The further development involves arranging and partially embedding an additional insert on the surface of the molded plastic film or the like, by placing the insert in or on the deep drawing mold before carrying out the

molding process, as explained in the English Abstract of this reference.

- 11) Reference A2 (German Patent Laying-Open Document 38 34 620), in addition to the subject matter summarized in the English Abstract, discloses a method and apparatus for molding and surface-graining or texturing a plastic film, web or panel that comprises at least two layers, whereby the upper layer has a flow temperature, flow temperature range, crystallite melting temperature, or crystallite melting temperature range of 3 to 50K lower than that of the lower layer, and/or the lower layer has a melt index that is $1/50$ to $3/5$ of the melt index of the upper layer. In this context, the upper layer faces toward the negative deep drawing mold. The upper layer and the lower layer are preferably heated to the same or approximately the same temperature value (with a temperature difference of not more than 20 K), whereby the upper layer has a lower viscosity than the lower layer. Thereby, the molding or deep drawing temperature directly before or during the molding is adjusted so that it is equal to or greater than the flow temperature, flow temperature range, crystallite melting temperature or crystallite melting temperature range of the upper layer, but simultaneously lower than the flow temperature, flow temperature range, crystallite melting temperature, or crystallite melting temperature range of the lower layer. The upper layer and the lower layer may respectively consist of the same polymer components in different proportional contents, or have different additives, or respectively consist of different polymer compositions. A

substrate with a foaming reaction mixture thereon can further be applied as a backing on the back side of the plastic film.

- 12) Reference AA2 (German Patent Laying-Open Document 38 34 648) discloses subject matter of which the relevant aspects are adequately summarized in the English Abstract thereof. The reference further discloses certain other features in common with some of the references discussed above.
- 13) Reference AB2 (German Patent 40 07 876) discloses a method for producing grained or surface textured thermoformable plastic films including an upper layer that is not cross-linkable or hardenable by means of electron beams and a lower layer that is hardenable or cross-linkable by electron beams. Relevant features of this process are summarized in the English Abstract of the reference.
- 14) Reference AC2 (German Patent 40 07 877) discloses subject matter that is summarized in the English Abstract thereof.
- 15) Reference AD2 (German Patent 40 30 477) discloses a method and an apparatus for producing molded components with a grained, textured or structured surface and a molded or formed wall. After the final molding or forming and surface texturing or graining of the plastic film, and either before, during or after closing a negative mold, polyolefin particles are brought into a space, then melted, deformed and sintered and thereby bonded to the molded and structured component. The disclosed method

aims to avoid the difficulty of bonding plastic foam layers to other plastic layers or film, and to avoid a peeling or separation of the plastic film from the foam layer.

- 16) Applicant respectfully requests that the Examiner consider all references of record, return an initialled copy of the enclosed Second Form PTO-1449 and ensure that all references of record are printed on any patent issuing from this application.

Respectfully submitted,

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I hereby certify that this correspondence with all indicated enclosures is being transmitted by telefax to (703) 872-9310 on the date indicated below, and is addressed to: Assistant Commissioner for Patents, Washington, D. C. 20231.

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Name: Walter F. Fasse - Date: February 10, 2003

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